

# Umetco Minerals Corporation

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P.O. BOX 1029  
GRAND JUNCTION, COLORADO 81502  
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February 14, 2006

Mr. William von Till, Project Manager  
Fuel Cycle Facilities Branch  
Division of Fuel Cycle Safety and Safeguards  
Mail Stop T-8-A-33  
Two White Flint North, 11545 Rockville Pike  
Rockville, Maryland 20852-2738

Subject: **500 cm Subsurface Borehole Sampling GHP-2**  
Re: **Materials License SUA-648, Docket No. 40-0299**

Dear Mr. von Till:

Attached are the  $^{226}\text{Ra}$  ingrowth samples results from the borehole sampling conducted at GHP-2 during the 2005 construction season. Sampling was conducted as specified in Section 2.3.1, (page 7) of the Final Design and Reclamation Plan for GHP No. 2/Mill Area as referenced by License Condition 61 of License SUA 648.

Additionally we have included a map showing locations of grids, borehole locations and sample date at GHP-2.

If you have any question or need additional information please contact by e-mail at [gieckte@dow.com](mailto:gieckte@dow.com) or by phone at 800-528-5815.

Sincerely;

Thomas E. Gieck  
Remediation Leader

TEG/jfc

Enclosures: As stated

**Table A.1.**  
**GHP-2 Subgrade Radium-226 Soil Sampling Results**

Composite Sample Depth (ft)	GHP-2 Subgrade Layer	Grid Number	Preparation & Initial Count Date	Ingrowth Count Date	Initial Results <sup>226</sup> Ra pCi/g	Ingrowth Results <sup>226</sup> Ra pCi/g (after 21 days)	Radon Model Input Parameters <sup>226</sup> Ra pCi/g
0-3'	Layer 4	1	7/25/2005	8/17/2005	19.3	24.3	69
3-6'	Layer 3	1	7/25/2005	8/17/2005	71.9	85.7	62
6-9'	Layer 2	1	7/25/2005	8/17/2005	101.1	125.1	55
9-12'	Layer 1	1	7/25/2005	8/17/2005	132.6	167.2	62
12-16'		1	7/25/2005	8/17/2005	126.3	164.0	62
0-3'	Layer 4	2	5/23/2005	6/26/2005	-	75.0	69
3-6'	Layer 3	2	5/23/2005	6/26/2005	-	68.5	62
6-9'	Layer 2	2	5/23/2005	6/26/2005	-	71.6	55
9-12'	Layer 1	2	5/23/2005	6/26/2005	-	62.0	62
12-15'		2	5/23/2005	6/26/2005	-	69.0	62
15'+		2	5/23/2005	6/26/2005	-	113.0	62
0-3'	Layer 4	3	5/23/2005	6/26/2005	9.0	15.9	69
3-6'	Layer 3	3	5/23/2005	6/26/2005	24.1	26.4	62
6-9'	Layer 2	3	5/23/2005	6/26/2005	13.1	14.9	55
9-12'	Layer 1	3	5/23/2005	6/26/2005	22.2	24.5	62
12-15'		3	5/23/2005	6/26/2005	21.2	23.2	62
15'+		3	5/23/2005	6/26/2005	22.0	26.2	62
0-3'	Layer 4	4	5/23/2005	6/27/2005	14.4	17.8	69
3-6'	Layer 3	4	5/23/2005	6/27/2005	14.7	19.4	62
6-9'	Layer 2	4	5/23/2005	6/27/2005	21.1	28.0	55
9-12'	Layer 1	4	5/23/2005	6/27/2005	11.5	14.7	62
12-15'		4	5/23/2005	6/27/2005	15.2	18.8	62
15'+		4	5/23/2005	6/26/2005	22.6	28.7	62
0-3'	Layer 4	5	5/23/2005	6/14/2005	12.8	14.9	69
3-6'	Layer 3	5	5/23/2005	6/14/2005	14.5	18.6	62
6-9'	Layer 2	5	5/23/2005	6/14/2005	17.4	21.6	55
9-12'	Layer 1	5	5/23/2005	6/24/2005	17.6	24.4	62
12-15'		5	5/23/2005	6/24/2005	15.6	20.9	62
15'+		5	5/23/2005	6/24/2005	27.5	36.0	62
0-3'	Layer 4	6	7/28/2005	9/14/2005	16.1	16.6	69
3-6'	Layer 3	6	7/28/2005	9/14/2005	13.2	15.6	62
6-9'	Layer 2	6	7/28/2005	9/14/2005	11.2	13.5	55
9-12'	Layer 1	6	-----	-----	-----	-----	62
12-16'		6	-----	-----	-----	-----	62
0-3'	Layer 4	7	7/27/2005	12/19/2005	17.7	23.2	69
3-6'	Layer 3	7	7/27/2005	12/13/2005	9.9	16.4	62
6-9'	Layer 2	7	7/27/2005	12/19/2005	13.6	18.0	55
9-12'	Layer 1	7	7/27/2005	9/14/2005	12.4	18.1	62
12-16'		7	7/27/2005	9/14/2005	12.7	18.7	62

**Table A.1.**  
**GHP-2 Subgrade Radium-226 Soil Sampling Results**

Composite Sample Depth (ft)	GHP-2 Subgrade Layer	Grid Number	Preparation & Initial Count Date	Ingrowth Count Date	Initial Results <sup>226</sup> Ra pCi/g	Ingrowth Results <sup>226</sup> Ra pCi/g (after 21 days)	Radon Model Input Parameters <sup>226</sup> Ra pCi/g
0-3'	Layer 4	8	7/26/2005	8/23/2005	11.6	15.3	69
3-6'	Layer 3	8	7/26/2005	8/23/2005	12.3	16.5	62
6-9'	Layer 2	8	7/26/2005	8/23/2005	11.2	15.2	55
9-12'	Layer 1	8	7/26/2005	8/23/2005	11.2	11.0	62
12-16'		8	7/26/2005	8/23/2005	28.2	34.7	62
0-3'	Layer 4	9	7/25/2005	8/15/2005	10.5	13.1	69
3-6'	Layer 3	9	7/25/2005	8/15/2005	14.3	19.2	62
6-9'	Layer 2	9	7/25/2005	8/15/2005	7.1	8.2	55
9-12'	Layer 1	9	7/25/2005	8/15/2005	15.1	19.5	62
12-16'		9	7/25/2005	8/15/2005	7.8	10.8	62
0-3'	Layer 4	10	7/20/2005	12/19/2005	79.1	106.5	69
3-6'	Layer 3	10	7/20/2005	12/19/2005	53.1	75.4	62
6-9'	Layer 2	10	7/21/2005	12/19/2005	43.7	60.7	55
9-12'	Layer 1	10	7/21/2005	12/19/2005	46.5	67.5	62
12-16'		10	7/20/2005	12/19/2005	7.4	9.4	62
0-3'	Layer 4	11	8/10/2005	9/7/2005	12.4	26.8	69
3-6'	Layer 3	11	8/3/2005	8/25/2005	7.0	10.5	62
6-9'	Layer 2	11	8/3/2005	12/14/2005	18.1	71.9	55
9-12'	Layer 1	11	7/26/2005	8/25/2005	44.7	46.0	62
12-16'		11	7/26/2005	12/14/2005	51.0	54.7	62
0-3'	Layer 4	12	7/26/2005	8/24/2005	15.2	15.2	69
3-6'	Layer 3	12	7/26/2005	8/23/2005	15.4	19.6	62
6-9'	Layer 2	12	7/26/2005	8/23/2005	29.6	38.1	55
9-12'	Layer 1	12	7/26/2005	8/23/2005	13.1	16.4	62
12-16'		12	7/26/2005	8/23/2005	16.0	21.0	62
0-3'	Layer 4	13	8/3/2005	12/15/2005	8.1	12.7	69
3-6'	Layer 3	13	7/26/2005	12/14/2005	17.6	18.7	62
6-9'	Layer 2	13	7/26/2005	12/15/2005	33.5	34.6	55
9-12'	Layer 1	13	7/26/2005	12/15/2005	14.3	15.3	62
12-16'		13	7/26/2005	12/15/2005	29.0	30.6	62
0-3'	Layer 4	14	7/28/2005	12/20/2005	34.8	37.9	69
3-6'	Layer 3	14	7/25/2005	12/20/2005	43.1	50.9	62
6-9'	Layer 2	14	7/25/2005	12/20/2005	99.2	117.8	55
9-12'	Layer 1	14	7/25/2005	12/20/2005	29.9	33.6	62
12-16'		14	7/25/2005	12/20/2005	5.9	7.7	62
0-3'	Layer 4	15	7/20/2005	12/20/2005	17.6	24.1	69
3-6'	Layer 3	15	7/20/2005	12/20/2005	10.0	12.5	62
6-9'	Layer 2	15	7/20/2005	12/20/2005	13.0	18.1	55
9-12'	Layer 1	15	7/20/2005	12/20/2005	18.8	30.0	62
12-16'		15	7/20/2005	12/20/2005	51.8	69.9	62

**Table A.1.**  
**GHP-2 Subgrade Radium-226 Soil Sampling Results**

Composite Sample Depth (ft)	GHP-2 Subgrade Layer	Grid Number	Preparation & Initial Count Date	Ingrowth Count Date	Initial Results <sup>226</sup> Ra pCi/g	Ingrowth Results <sup>226</sup> Ra pCi/g (after 21 days)	Radon Model Input Parameters <sup>226</sup> Ra pCi/g
0-3'	Layer 4	16	7/20/2005	8/15/2005	17.8	26.7	69
3-6'	Layer 3	16	7/20/2005	8/15/2005	11.4	16.8	62
6-9'	Layer 2	16	7/20/2005	8/15/2005	21.7	32.5	55
9-12'	Layer 1	16	7/20/2005	8/15/2005	14.7	22.9	62
12-16'		16	7/20/2005	8/15/2005	32.1	46.5	62
0-3'	Layer 4	17	7/26/2005	8/24/2005	11.6	16.7	69
3-6'	Layer 3	17	7/26/2005	8/24/2005	11.7	15.8	62
6-9'	Layer 2	17	7/26/2005	8/25/2005	11.6	14.2	55
9-12'	Layer 1	17	7/26/2005	8/25/2005	7.6	10.4	62
12-16'		17	7/26/2005	8/25/2005	11.8	14.7	62
0-3'	Layer 4	18	7/27/2005	8/24/2005	17.9	20.1	69
3-6'	Layer 3	18	7/27/2005	8/24/2005	31.6	40.3	62
6-9'	Layer 2	18	7/27/2005	8/24/2005	7.3	10.2	55
9-12'	Layer 1	18	7/27/2005	8/24/2005	6.5	8.9	62
12-16'		18	7/27/2005	8/24/2005	6.8	9.0	62
0-3'	Layer 4	19	8/3/2005	12/20/2005	11.8	13.2	69
3-6'	Layer 3	19	7/27/2005	12/20/2005	6.6	7.5	62
6-9'	Layer 2	19	7/27/2005	12/20/2005	11.3	11.3	55
9-12'	Layer 1	19	7/27/2005	12/21/2005	11.2	25.1	62
12-16'		19	7/27/2005	12/21/2005	24.5	32.0	62
0-3'	Layer 4	20	7/28/2005	12/21/2005	18.4	22.0	69
3-6'	Layer 3	20	7/28/2005	12/21/2005	12.4	16.4	62
6-9'	Layer 2	20	7/28/2005	12/21/2005	11.0	12.8	55
9-12'	Layer 1	20	7/28/2005	12/21/2005	7.5	7.7	62
12-16'		20	7/28/2005	12/21/2005	10.1	11.8	62
0-3'	Layer 4	21	7/28/2005	12/21/2005	8.1	8.6	69
3-6'	Layer 3	21	7/28/2005	12/21/2005	10.7	11.8	62
6-9'	Layer 2	21	7/28/2005	12/21/2005	7.8	8.8	55
9-12'	Layer 1	21	7/28/2005	12/21/2005	12.5	13.7	62
12-16'		21	7/28/2005	12/21/2005	20.9	24.0	62
0-3'	Layer 4	22	7/27/2005	12/22/2005	8.0	8.7	69
3-6'	Layer 3	22	7/28/2005	12/22/2005	21.4	25.1	62
6-9'	Layer 2	22	7/27/2005	12/22/2005	14.0	15.4	55
9-12'	Layer 1	22	7/27/2005	12/22/2005	25.5	28.7	62
12-16'		22	7/28/2005	12/22/2005	22.9	28.0	62
0-3'	Layer 4	23	7/26/2005	8/25/2005	11.3	15.8	69
3-6'	Layer 3	23	7/26/2005	8/25/2005	16.5	21.1	62
6-9'	Layer 2	23	7/26/2005	8/25/2005	11.9	16.1	55
9-12'	Layer 1	23	7/26/2005	8/25/2005	11.0	12.6	62
12-16'		23	7/26/2005	8/25/2005	7.0	8.7	62

**Table A.1.**  
**GHP-2 Subgrade Radium-226 Soil Sampling Results**

Composite Sample Depth (ft)	GHP-2 Subgrade Layer	Grid Number	Preparation & Initial Count Date	Ingrowth Count Date	Initial Results <sup>226</sup> Ra pCi/g	Ingrowth Results <sup>226</sup> Ra pCi/g (after 21 days)	Radon Model Input Parameters <sup>226</sup> Ra pCi/g
0-3'	Layer 4	24	7/25/2005	8/16/2005	47.8	17.3	69
3-6'	Layer 3	24	7/25/2005	8/16/2005	23.5	19.3	62
6-9'	Layer 2	24	7/25/2005	8/16/2005	25.4	30.9	55
9-12'	Layer 1	24	7/25/2005	8/16/2005	13.8	29.1	62
12-16'		24	7/25/2005	8/16/2005	13.0	56.2	62
0-3'	Layer 4	25	7/25/2005	8/15/2005	7.7	10.5	69
3-6'	Layer 3	25	7/25/2005	8/15/2005	4.8	5.3	62
6-9'	Layer 2	25	7/25/2005	8/15/2005	4.8	5.5	55
9-12'	Layer 1	25	7/25/2005	8/15/2005	4.7	5.5	62
12-16'		25	7/25/2005	8/15/2005	12.6	14.6	62
0-3'	Layer 4	26	7/25/2005	8/17/2005	13.5	19.4	69
3-6'	Layer 3	26	7/25/2005	8/17/2005	21.4	28.2	62
6-9'	Layer 2	26	7/25/2005	8/17/2005	33.0	40.0	55
9-12'	Layer 1	26	7/25/2005	8/17/2005	23.7	28.4	62
12-16'		26	7/25/2005	8/17/2005	8.8	12.5	62
0-3'	Layer 4	27	7/25/2005	8/17/2005	6.5	9.1	69
3-6'	Layer 3	27	7/25/2005	8/16/2005	19.8	27.3	62
6-9'	Layer 2	27	7/25/2005	8/16/2005	19.4	23.8	55
9-12'	Layer 1	27	7/25/2005	8/16/2005	23.5	29.8	62
12-16'		27	7/25/2005	8/16/2005	23.4	31.9	62
0-3'	Layer 4	28	7/21/2005	8/16/2005	8.0	11.7	69
3-6'	Layer 3	28	7/21/2005	8/16/2005	22.3	31.4	62
6-9'	Layer 2	28	7/21/2005	8/16/2005	25.0	34.2	55
9-12'	Layer 1	28	7/25/2005	8/16/2005	22.5	29.9	62
12-16'		28	7/25/2005	8/16/2005	7.7	9.7	62
0-3'	Layer 4	29	7/21/2005	12/22/2005	11.6	18.1	69
3-6'	Layer 3	29	7/21/2005	12/22/2005	14.7	20.7	62
6-9'	Layer 2	29	7/21/2005	12/22/2005	7.9	12.2	55
9-12'	Layer 1	29	7/21/2005	12/22/2005	4.7	7.2	62
12-16'		29	7/21/2005	12/22/2005	8.8	11.0	62
0-3'	Layer 4	30	8/2/2005	12/15/2005	1.3	19.3	69
3-6'	Layer 3	30	7/26/2005	12/22/2005	19.4	20.5	62
6-9'	Layer 2	30	7/27/2005	12/23/2005	11.3	26.5	55
9-12'	Layer 1	30	7/27/2005	12/23/2005	11.2	16.6	62
12-16'		30	7/27/2005	12/23/2005	24.5	11.9	62
0-3'	Layer 4	31	7/27/2005	12/23/2005	7.1	8.0	69
3-6'	Layer 3	31	7/28/2005	12/23/2005	14.5	17.8	62
6-9'	Layer 2	31	7/27/2005	12/23/2005	11.5	13.4	55
9-12'	Layer 1	31	7/28/2005	12/23/2005	9.2	11.1	62
12-16'		31	7/27/2005	12/27/2005	24.2	27.6	62

**Table A.1.**  
**GHP-2 Subgrade Radium-226 Soil Sampling Results**

Composite Sample Depth (ft)	GHP-2 Subgrade Layer	Grid Number	Preparation & Initial Count Date	Ingrowth Count Date	Initial Results <sup>226</sup> Ra pCi/g	Ingrowth Results <sup>226</sup> Ra pCi/g (after 21 days)	Radon Model Input Parameters <sup>226</sup> Ra pCi/g
0-3'	Layer 4	32	7/28/2005	12/27/2005	10.8	11.3	69
3-6'	Layer 3	32	7/27/2005	12/27/2005	10.1	11.3	62
6-9'	Layer 2	32	7/28/2005	12/27/2005	10.4	13.0	55
9-12'	Layer 1	32	7/28/2005	12/27/2005	4.7	5.1	62
12-16'		32	7/28/2005	12/27/2005	6.5	7.1	62
0-3'	Layer 4	33	7/28/2005	12/15/2005	14.4	15.7	69
3-6'	Layer 3	33	7/28/2005	12/15/2005	2.4	3.1	62
6-9'	Layer 2	33	7/28/2005	12/15/2005	2.2	2.2	55
9-12'	Layer 1	33	7/28/2005	12/14/2005	13.7	16.8	62
12-16'		33	7/28/2005	12/15/2005	6.7	8.0	62
0-3'	Layer 4	34	7/28/2005	12/27/2005	17.7	18.7	69
3-6'	Layer 3	34	7/28/2005	12/28/2005	10.4	10.4	62
6-9'	Layer 2	34	7/28/2005	12/28/2005	8.9	10.0	55
9-12'	Layer 1	34	7/28/2005	12/28/2005	7.6	8.5	62
12-16'		34	7/28/2005	12/28/2005	7.1	7.5	62
0-3'	Layer 4	35	7/28/2005	12/28/2005	13.7	15.1	69
3-6'	Layer 3	35	7/27/2005	12/28/2005	176.2	175.3	62
6-9'	Layer 2	35	7/27/2005	12/28/2005	101.5	109.0	55
9-12'	Layer 1	35	7/27/2005	12/29/2005	19.6	22.7	62
12-16'		35	7/28/2005	12/29/2005	25.4	29.3	62
0-3'	Layer 4	36	7/26/2005	8/18/2005	10.7	13.6	69
3-6'	Layer 3	36	7/26/2005	8/18/2005	5.7	8.0	62
6-9'	Layer 2	36	7/26/2005	8/18/2005	28.0	33.3	55
9-12'	Layer 1	36	7/26/2005	8/25/2005	8.4	5.8	62
12-16'		36	7/26/2005	8/18/2005	41.8	53.4	62

Layer (Depth)	Average Initial	Average Ingrowth	Percent Ingrowth
Layer 4 (0-3')	17.1	21.1	18.9
Layer 3 (3-6')	19.1	28.0	31.8
Layer 2 (6-9')	22.2	31.5	29.4
Layer 1 (9-16')	22.7	28.5	20.5

1. The above spreadsheet is being utilized to demonstrate compliance with:

a) License Condition 61 stipulates in part, "the reclamation of Pond No. 2 will be performed according to the final plan submitted on September 11, 2003. In addition, the Ra-226 data for the solidified pond sludge shall be submitted to the NRC, before radon barrier placement, begins, to justify that the Ra-226 values used in the radon flux model are representative. If the measured values are significantly higher than the estimated values, Umetco will provide a revised radon flux model to demonstrate that the long-term radon flux from the cover

b) The Final Design and Reclamation Plan for GHP-2 / Mill Area, Section 2.3.1 Waste Material Input Parameters, Radium Activity, Paragraphs 4 & 5, Page 7, Revision 1, September 2003.

2. Preparation date is the day the sample sealed into the Meranelli beaker. Typical analytical results have shown Ra-226 values increased 15 -23% after the 21 day ingrowth period.

UMETCO MINERALS CORPORATION

GHP No. 2

500 CM - SUBGRADE  
SOIL SAMPLE LOCATIONS

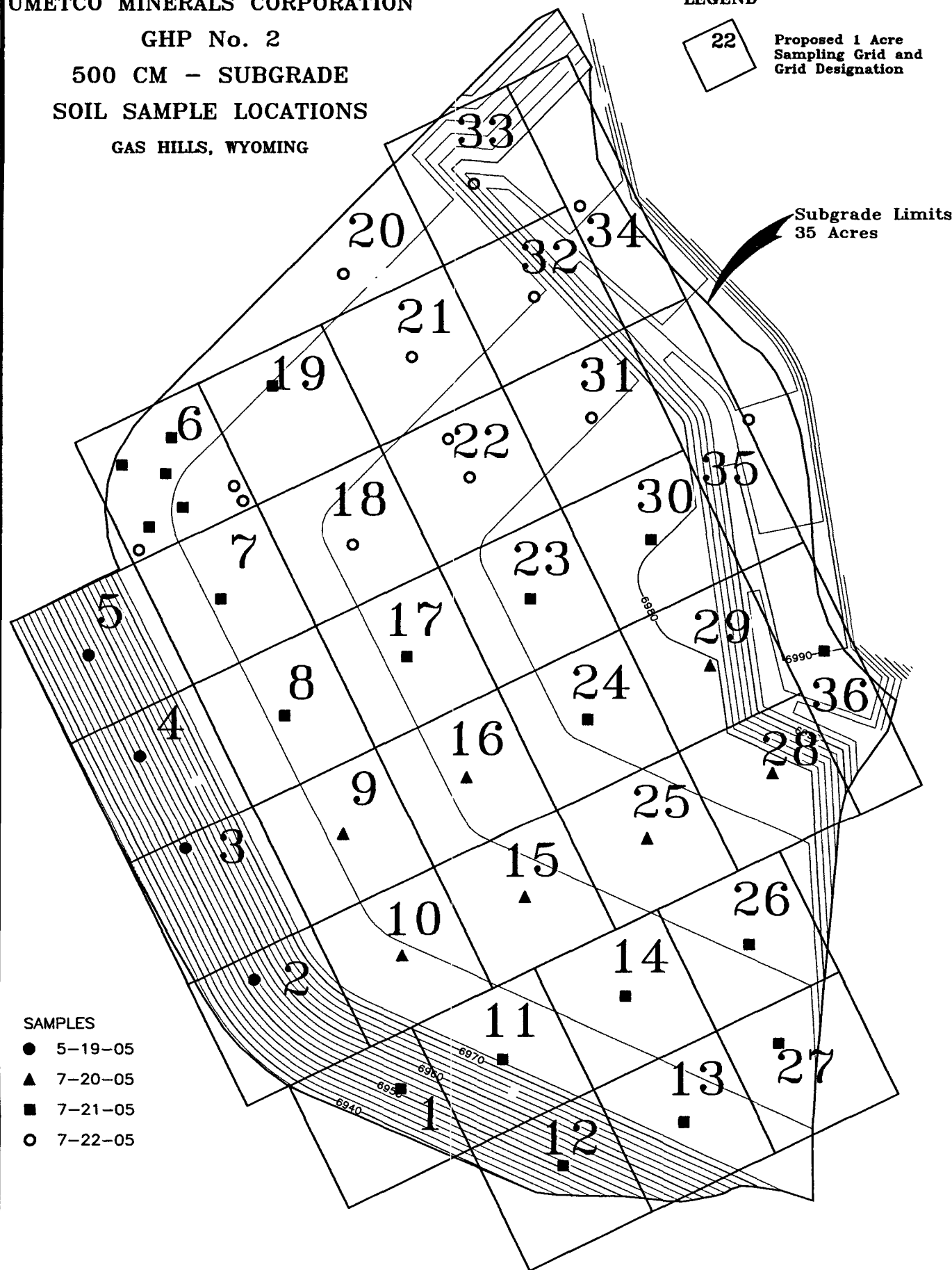
GAS HILLS, WYOMING

LEGEND



Proposed 1 Acre  
Sampling Grid and  
Grid Designation

Subgrade Limits  
35 Acres



SAMPLES

- 5-19-05
- ▲ 7-20-05
- 7-21-05
- 7-22-05